

CLAIMS:

1. An AGC method for a digital radio receiver, wherein a gain of an amplifier of said receiver is automatically changed in accordance with a level of a signal received by the digital radio receiver thereby to control a gain, the method comprising the steps of:

(a) detecting instantaneous values of envelope of the input received signal sequentially at predetermined time intervals;

(b) determining first interval average value providing an average of instantaneous values for a first predetermined time length before the instantaneous value detected, and determining the second interval average value providing an average of the instantaneous values during a second predetermined time length shorter than the first predetermined time length before the instantaneous value detected;

(c) determining a difference between the instantaneous value and the first interval average value;

(d) in the case where the difference exceeds a predetermined threshold value, setting the gain of the amplifier at a value corresponding to the second interval average value during the second predetermined time length before the instantaneous value upon the lapse of a third predetermined time length from the time when the difference exceeds the predetermined threshold value; and

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(e) maintaining, during a fourth predetermined time length following the lapse of the third predetermined time length, the gain to the value set in step (d), and at each detection time point of the instantaneous value after the lapse of the fourth predetermined time length, setting the gain to a value corresponding to the first interval average value during the first predetermined time length before the instantaneous value.

2. An AGC method according to Claim 1, further comprising the step of setting, until the lapse of said third predetermined time length, the gain of said amplifier to a value corresponding to the first interval average value providing an average of the instantaneous values during a first predetermined time length before the instantaneous value.

3. An AGC method according to Claim 1, wherein the time length before the lapse of said third predetermined time length and said fourth predetermined time length after the received signal is input and said difference value exceeds said threshold value, is sufficient for said first interval average value to converge.

4. An AGC method according to Claim 1, wherein the time length before the lapse of said third predetermined time length after the received signal is input and said difference value exceeds said threshold value is sufficient for said second interval average

DRAFT - 06/22/2012 - 04

value to converge.

5. An AGC method according to Claim 1, wherein a RSSI signal is detected from said received signal, and the instantaneous value of said detected RSSI signal is assumed to be said instantaneous value for said envelope of said received signal.

6. An AGC method according to Claim 1, wherein said received signal has a frame structure, and said step (d) is executed during the interval not containing the information of said frame structure.

7. An AGC circuit comprising an amplifier supplied with a signal received by a digital radio receiver, the amplifier controlling a gain by changing a gain automatically in accordance with a signal level of the input received signal, the circuit further comprising:

a detection unit for detecting and outputting the instantaneous value of the envelope of the input received signal sequentially at predetermined time intervals;

an interval average value calculation unit connected to the detection unit for determining a first interval average value providing an average of instantaneous values during a first predetermined time length before the instantaneous value detected by the detection unit, and also determining a second interval average value providing an average of instantaneous values during a second predetermined time length

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shorter than said first predetermined time length before the instantaneous value detected by the detection unit;

a difference calculation unit connected to the detection unit and said interval average value calculation unit for determining the difference between the detected instantaneous value and the first interval average value;

a switching unit for selectively outputting one of the first interval average value and the second interval average value determined by the interval average value calculation unit;

a switching control unit for controlling the switching unit; and

a gain control unit connected to the output of the switching unit for outputting a signal for changing the gain of the amplifier in accordance with the output of the switching unit;

wherein in the case where the difference value calculated by the difference calculation unit exceeds a predetermined threshold value, the switching control unit controls the switching unit in such a manner as to output the second interval average value to said gain control unit;

wherein the switching unit is controlled in such a manner that the second interval average value as of a time point when said difference exceeds said predetermined threshold value continues to be applied

2025 RELEASE UNDER E.O. 14176

to the gain control unit until lapse of a third predetermined time length and a fourth predetermined time length after said difference exceeds said predetermined threshold value; and

wherein after the lapse of said third predetermined time length and said fourth predetermined time length, the switching unit is controlled in such a manner that the first interval average value determined by the interval average value calculation unit during the predetermined time length before the instantaneous value is output to the gain control unit at each time point of detecting the instantaneous value.

8. An AGC circuit according to Claim 7, wherein said detection unit detects the RSSI signal from the received signal and outputs the instantaneous value of the detected RSSI signal as said instantaneous value of said envelope of said received signal.

9. An AGC circuit comprising a amplifier supplied with the signal received by a digital radio receiver for controlling the gain by changing the gain automatically in accordance with the signal level of the input received signal, the circuit further comprising:

a detection unit for detecting and outputting the instantaneous value of the envelope of the input received signal sequentially at predetermined time intervals;

a first interval average value calculation

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unit connected to the detection unit for determining a first interval average value providing an average of the instantaneous values during a first predetermined time length before the instantaneous value detected by the detection unit;

a second interval average value calculation unit connected to the detection unit for determining a second interval average value providing an average of the instantaneous values during a second predetermined time length shorter than the first predetermined time length before the instantaneous value detected by the detection unit;

a difference calculation unit connected to the detection unit and the first interval average value calculation unit for determining a difference between the detected instantaneous value and the first interval average value;

a switching unit for selectively outputting one of the first interval average value determined by the first interval average value calculation unit and the second interval average value determined by the second interval average value calculation unit;

a switching control unit for controlling the switching unit; and

a gain control unit connected to the output of the switching unit for outputting a signal for changing the gain of the amplifier in accordance with the output of the switching unit;

wherein in the case where the difference value calculated by the difference calculation unit exceeds a predetermined threshold value, the switching control unit controls the switching unit in such a manner that the second interval average value during the second predetermined time length before the instantaneous value as of the lapse of the third predetermined time length is applied, upon the lapse of the third predetermined time length after the difference exceeds the predetermined threshold value, from the second interval average value calculation unit to the gain control unit;

wherein the switching unit is controlled in such a manner that the second interval average value during the second interval average value before the instantaneous value as of the lapse of the third predetermined time length continues to be applied to the gain control unit until the lapse of the fourth predetermined time length after the third predetermined time length; and

wherein upon the lapse of the fourth predetermined time length, the switching unit is controlled in such a manner that the first interval average value determined by the first interval average value calculation unit during the predetermined time length before the instantaneous value is output to the gain control unit at each time point of detecting the instantaneous value.

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10. An AGC circuit for a digital radio receiver, comprising:

an input terminal for inputting a received  
input signal;

an amplifier coupled to said input terminal; a demodulator coupled to said amplifier;

a detection unit, coupled to said input terminal, for detecting an instantaneous value of envelope of the input received signal sequentially at predetermined time intervals;

a long interval average value calculation unit, coupled to the detection unit, for determining a long interval average value providing an average of instantaneous values during a first predetermined time length;

a short interval average value calculation unit, coupled to the detection unit, for determining a short interval average value providing an average of instantaneous values during a second predetermined time length shorter than said first predetermined time length;

a gain controller, coupled to said amplifier, for controlling an amplifier of said amplifier; and

a switching control unit, coupled to said short and long interval average value calculation units, for selectively controlling so as to apply one of the short interval average value and the long interval average value to said gain controller.

11. An AGC circuit according to Claim 10, wherein said switching control Unit includes a calculation unit for obtaining a difference between the detected instantaneous value and the long interval average value, and a comparator for comparing the difference with a predetermined threshold value.

12. An AGC circuit according to Claim 11, wherein said gain controller includes a sample and hold circuit for holding the short interval average value from said short interval average value calculation unit.

13. An AGC method for a digital radio receiver, wherein a gain of an amplifier of said receiver is automatically changed in accordance with a level of a signal received by the digital radio receiver thereby to control a gain, the method comprising the steps of:

(a) detecting the instantaneous value of the envelope of the input received signal sequentially at predetermined time intervals;

(b) determining the first interval average value providing an average of the instantaneous value for a first predetermined time length, and determining the second interval average value providing an average of the instantaneous value for a second predetermined time length;

(c) determining the difference between the instantaneous value and said first interval average value; and

(d) in the case where the difference exceeds

a predetermined threshold value, setting the gain of the amplifier corresponding to the second interval average value after a predetermined third time length from said case occurred.

14. An AGC method according to Claim 13, further comprising the step:

(e) maintaining the gain of the amplifier corresponding to the second interval average value, during a fourth interval time length following the laps of said third interval time length, and setting the gain of the amplifier corresponding to the first interval average value after said fourth interval time length.

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